

YOR9-2001-0335
Amendment dated 06/23/2003

09/917,818

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Reply to office action mailed 04/22/2003

The following is a complete listing of all claims in the application, with an indication of the status of each:

Listing of claims:

1 1. (original) A method for identifying a cost-minimizing bid set for reverse
2 combinatorial auctions where all-or-nothing bids are allowed, said method
3 comprising:
4 introducing a decision variable for each bid;
5 introducing a counting variable to indicate whether bids from a
6 supplier are chosen in an optimal bid set;
7 modeling demand constraints for each item using the bid variables;
8 modeling minimum and maximum numbers of suppliers based on the
9 counting variables;
10 introducing dummy variables to ensure existence of feasible solutions;
11 for a given cost, formulating an objective of choosing bids that arrive
12 early based on an additional timestamped objective with the given cost level
13 as a constraint; and
14 introducing price modifications to handle the formulated objective of
15 choosing bids that arrive early.

1 2. (original) The method of claim 1, wherein the auction is a single-round
2 auction.

1 3. (original) The method of claim 1, wherein the auction is a multiple-round
2 auction.

1 4. (original) A method for implementing a reverse combinatorial auction in
2 which items of varying quantities are purchased, comprising:
3 (a) defining one or more parameters for the auction;
4 (b) accepting bids for a plurality of items in the auction;
5 (c) creating a set-covering formulation from said bids;
6 (d) adding predetermined business rules as a constraint to the set-
7 covering formulation;
8 (e) automatically generating a computer-implemented
9 representation of the set-covering formulation as constrained by said business
10 rules; and
11 (f) determining a cost-minimizing bid set based on an
12 implementation of the computer-implemented representation.

1 5. (original) The method of claim 4, wherein said parameters include
2 information identifying the auction as at least one of the following: a single-
3 round or multiple-round auction; an open-cry or sealed-bid auction; an auction
4 with or without reservation; and potential suppliers.

1 6. (original) The method of claim 4, wherein step (e) includes:
2 creating a constraint matrix corresponding to the set-covering
3 formulation;
4 determining a size of and a number of non-zero entries in the
5 constraint matrix based on said one or more parameters;
6 modifying the size of the constraint matrix to account for dummy bids
7 added to the set-covering formulation;
8 creating an array for said constraint matrix; and
9 populating the array based on the set-covering formulation.

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1 7. (original) The method of claim 6, wherein said step of determining non-
2 zero entries in said constraint matrix includes:
3 defining respective indexes for said suppliers and a number of bids for
4 each of said suppliers;
5 generating an item vector for each of said bids;
6 determining a number of items in each item vector;
7 adding the number of items in each item vector to a count of non-zero
8 entries for each bid of each of said suppliers;
9 for each of said suppliers, increasing the count by a predetermined
10 number to account for counting variables; and
11 updating the count to add non-zeros for the dummy variables.

1 8. (original) The method of claim 6, wherein said step of creating a
2 constraint matrix includes:
3 initializing a supplier index, a non-zero count variable, and a column
4 count variable;
5 acquiring information corresponding to a first supplier bid;
6 acquiring an item vector for the first supplier bid;
7 updating an initial objective value for a decision variable;
8 for each non-zero item in an item vector, introducing a non-zero entry
9 in the constraint matrix;
10 for each bid, add two non-zero entries for a min/max quantity
11 constraint; and
12 adding the non-zero entries for the counting variables.

1 9. (original) The method of claim 8, wherein said step of adding non-zero
2 entries includes:

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3 introducing a non-zero entry for a minimum quantity constraint and a
4 maximum quantity constraint;
5 adding a non-zero entry for a minimum number of suppliers constraint;
6 and
7 adding non-zeros associated with a dummy variable.

1 10. (original) The method of claim 4, further comprising:
2 populating arrays associated with constraints in accordance with steps
3 that include:
4 initializing an index for items and suppliers;
5 defining lower and upper bounds for each of a plurality of demand
6 constraints;
7 defining the lower and upper bounds for a min/max quantity
8 constraint; and
9 defining lower and upper bounds for a minimum number and a
10 maximum number of supplier constraints.

1 11. (previously amended) The method of claim 4, wherein step (f) is
2 performed by a linear programming/integer programming (LP/IP) solver.